

WHAT IS CLAIMED IS:

1. A belt scraper comprising:
a blade holder;
a mount adapted to position said blade holder transverse to a belt;
a blade mounted on said blade holder; and
a tensioner including an outer collar affixed to said mount and an inner collar affixed to said blade holder, and a torsion spring coupled between said inner and outer collars for urging said blade toward the belt.

2. The belt scraper of claim 1 wherein said blade comprises a blade body having a pair of substantially parallel skirts extending therefrom defining a blade cavity, wherein said blade is mounted on said blade holder with said blade holder disposed in said blade cavity with said skirts releasably engaging said blade holder.

3. The belt scraper of claim 2 wherein said blade holder includes a rod and a longitudinal key-bar extending radially therefrom, said blade body having a key-bar slot in the blade cavity for receiving said key-bar when said rod is disposed in the blade cavity.

4. The belt scraper of claim 3 wherein said key-bar has a length shorter than said blade body, whereby a portion of the key-bar slot is not filled by said key-bar, further comprising an "L"-shaped tool having a tool end adapted for insertion into an unfilled portion of the key-bar slot and having a handle end movable to cause the tool end to urge said blade away from said blade holder.

5. The belt scraper of claim 4 wherein said blade holder has a cavity proximate said key-bar adapted for receiving said "L"-shaped tool, and wherein said "L"-shaped tool is rotatably mounted in the cavity of said blade holder with the tool end thereof aligned with said key-bar.

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6. The belt scraper of claim 2 wherein said blade and said blade holder have respective complementary engaging features that engage when said blade is mounted on said blade holder for limiting longitudinal movement of said blade with respect to said blade holder.
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7. The belt scraper of claim 6 wherein one of said blade and said blade holder has a plurality of the complementary engaging features longitudinally spaced, whereby longitudinal movement of said blade with respect to said blade holder may be indexed at a plurality of longitudinal positions.
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8. The belt scraper of claim 1 wherein said mount includes a pair of spaced apart mounting plates each having a hole therein, and wherein said blade holder includes a rod having ends disposed in the holes of said mounting plates.
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9. ~~The belt scraper of claim 8, said mounting plates having at least one of a bushing in the hole thereof and a through hole in the shape of one of a circular hole, a slot and a "T"-shaped slot.~~
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10. The belt scraper of claim 1 wherein said mount includes at least one bushing for positioning said blade holder, said bushing having a funnel-shaped hole for receiving said blade holder.
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11. ~~The belt scraper of claim 1 wherein said tensioner further includes a housing member fixed with respect to said mount and extending proximate said inner and outer collars, and a clamp for releasably constraining the rotational position of said outer collar with respect to said housing member.~~
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12. The belt scraper of claim 11 wherein said housing member has an arcuate shape complementary to an arcuate edge of said outer collar, and wherein said clamp engages the arcuate shape of said outer collar with the arcuate shape of said housing member.

13. The belt scraper of claim 12 wherein said housing member has a first slot and wherein said clamp includes a locking handle engaging the arcuate edge of said outer collar through the first slot of said housing member.
14. The belt scraper of claim 13 wherein the first slot of said housing member lies along the arcuate edge of said outer collar, whereby moving said clamp along said first slot rotates said outer collar with respect to said housing member.
15. The belt scraper of claim 13 wherein said housing member has a longitudinal slot transverse to the first slot for providing an opening from the first slot through which said clamp may be removed from said housing member.
16. The belt scraper of claim 15 wherein said torsion spring is fastened to said inner collar and/or said outer collar so as to be removed from said housing member as a unitary member.
17. The belt scraper of claim 13 wherein positioning said clamp at an end of the first slot corresponds to said torsion spring having a predetermined spring tension.
18. The belt scraper of claim 11 wherein said clamp includes at least one of a torque limiting clutch and an anti-vibration device.
19. The belt scraper of claim 1 positioned in one of a primary scraper position, a secondary scraper position, and a diverting scraper position with respect to a belt.
20. The belt scraper of claim 1 wherein at least one of said blade, said blade holder, and said tensioner is of a material compatible with the sanitary processing of food and food products.

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inherent
21. The belt scraper of claim 1 in combination with a conveyor belt movable on a head pulley and a tail pulley for moving material wherein the tensioner tensions said blade to bear against said belt.

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22. A belt scraper comprising:
- a blade holder;
 - a scraper blade having a blade body, a blade tip on one end of said blade body and a pair of skirts extending from an end of said blade body opposite the blade tip, wherein said pair of skirts are flexible and define a blade cavity for receiving and engaging said blade holder;
 - wherein said scraper blade is mounted on said blade holder with said blade holder disposed in said blade cavity with said skirts releasably engaging said blade holder; and
 - a tensioner adapted for urging said scraper blade toward a belt.
- fig. 1
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- * 4,598,823 *
- Scraper
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23. The belt scraper of claim 22 wherein said blade holder includes a rod and a longitudinal key-bar extending radially therefrom, said blade body having a key-bar slot in the blade cavity for receiving said key-bar when said rod is disposed in the blade cavity.
24. The belt scraper of claim 23 wherein said key-bar has a length shorter than said blade body, whereby a portion of the key-bar slot is not filled by said key-bar, further comprising an "L"-shaped tool having a tool end adapted for insertion into an unfilled portion of the key-bar slot and having a handle end movable to cause the tool end to urge said blade away from said blade holder.
25. The belt scraper of claim 23 wherein said blade holder has a cavity proximate said key-bar adapted for receiving said "L"-shaped tool, and wherein said "L"-shaped tool is rotatably mounted in the cavity of said blade holder with the tool end thereof aligned with said key-bar.

103 ✓ 26. The belt scraper of claim 22 wherein said scraper blade and said blade holder have respective complementary engaging features that engage when said scraper blade is mounted on said blade holder for limiting longitudinal movement of said scraper blade with respect to said blade holder.

103 ✓ 27. The belt scraper of claim 22 wherein one of said scraper blade and said blade holder has a plurality of the complementary engaging features longitudinally spaced, whereby longitudinal movement of said scraper blade with respect to said blade holder may be indexed in a plurality of longitudinal positions.

103 ✓ 28. The belt scraper of claim 22 wherein said tensioner includes a stationary member extending proximate said blade holder, a torsional spring coupled between said stationary member and said blade holder adapted for urging rotation of said scraper blade, and a clamp for releasably constraining the rotational position of one end of said torsional spring with respect to said stationary member. *→ casing*

29. The belt scraper of claim 28 wherein said stationary member has a first slot and wherein said clamp includes a locking handle engaging said blade holder through the first slot of said stationary member.

30. The belt scraper of claim 29 wherein the first slot of said stationary member lies along an arcuate edge of said blade holder, whereby moving said clamp along said first slot rotates said blade holder with respect to said stationary member.

31. The belt scraper of claim 29 wherein said stationary member has a longitudinal slot transverse to the first slot for providing an opening from the first slot through which said clamp may be removed from said stationary member.

32. The belt scraper of claim 30 wherein said torsional spring and said clamp are adapted to be removed from said stationary member as a unitary member.

33. The belt scraper of claim 29 wherein positioning said clamp at an end of the first slot corresponds to said tensioner urging said scraper blade against the belt with a predetermined tension.

34. The belt scraper of claim 28 wherein said clamp includes at least one of a torque limiting clutch and an anti-vibration device.

35. The belt scraper of claim 22 positioned in one of a primary scraper position, a secondary scraper position, and a diverting scraper position with respect to a belt.

36. The belt scraper of claim 22 wherein at least one of said scraper blade, said blade holder, and said tensioner is of a material compatible with the sanitary processing of food and food products.

37. The belt scraper of claim 22 wherein one of said scraper blade and said blade holder includes a projecting feature and the other of said scraper blade and said blade holder includes a corresponding recess, whereby engaging the projecting feature and the corresponding recess constrains longitudinal movement of said scraper blade with respect to said blade holder.

38. The belt scraper of claim 37 wherein one of said scraper blade and said blade holder has a plurality of corresponding recesses longitudinally spaced, whereby longitudinal movement of said scraper blade with respect to said blade holder may be indexed at a plurality of longitudinal positions.

39. A blade assembly comprising:

a scraper blade having a blade body, a blade tip on one end of said body and a pair of skirts extending from an end of said body opposite the blade tip, wherein said pair of skirts are flexible and define a blade cavity and a key-bar groove therein; and

a blade holder including a rod disposed in said blade cavity and an elongated key-bar extending radially from said rod with said key-bar disposed in said key-bar groove, said pair of skirts releasably engaging the rod of said blade holder.

40. The blade assembly of claim 39 wherein said key-bar has a length shorter than said blade body, whereby a portion of the key-bar slot is not filled by said key-bar, further comprising an "L"-shaped tool having a tool end adapted for insertion into an unfilled portion of the key-bar slot and having a second end movable to cause the tool end to urge said scraper blade away from said blade holder.

41. The blade assembly of claim 40 wherein said blade holder has a cavity proximate said key-bar adapted for receiving said "L"-shaped tool, and wherein said "L"-shaped tool is rotatably mounted in the cavity of said blade holder with the tool end thereof aligned with said key-bar.

42. The blade assembly of claim 39 wherein one of said scraper blade and said blade holder includes a projecting feature and the other of said scraper blade and said blade holder includes a corresponding recess, whereby engaging the projecting feature and the corresponding recess constrains longitudinal movement of said scraper blade with respect to said blade holder.

43. The blade assembly of claim 42 wherein one of said scraper blade and said blade holder has a plurality of corresponding recesses longitudinally spaced, whereby longitudinal movement of said scraper blade with respect to said blade holder may be indexed in a plurality of longitudinal positions.
44. The blade assembly of claim 3928 wherein said blade holder comprises a second rod substantially parallel to and spaced apart from said rod, and a web joining said second rod and said rod.
45. The blade assembly of claim 39 wherein at least one of said scraper blade and said blade holder is of a material compatible with the sanitary processing of food and food products.
46. The blade assembly of claim 39 wherein said rod is at least in part cylindrical.
47. The blade assembly of claim 39 wherein said blade body includes a body portion and a tip portion, wherein said body portion is of a material of given durometer selected for providing desired flexibility to said pair of skirts, and wherein said tip portion defines said blade tip and is formed of a material of durometer substantially less than the given durometer.
48. The blade assembly of claim 47 wherein said material of said tip portion is of durometer of about 85.
49. A scraper blade comprising an elongate body having a blade tip along one elongate end of said body and having a pair of skirts along and extending from an elongate end of said body opposite the blade tip, wherein said pair of skirts are flexible and define a groove adapted for receiving and engaging a blade holder.

50. The scraper blade of claim 49 wherein said blade body has within the groove therein at least one of a projecting feature and a recess adapted for engaging a corresponding one of a recess and a projecting feature on a blade holder.
51. The scraper blade of claim 49 in combination with an elongate blade holder, wherein the pair of skirts of said scraper blade are sized to engage said blade holder in a snap-on snap-off manner.
52. The scraper blade of claim 49 wherein said blade body has first and second elongate sides, wherein said first elongate side has a substantially flat surface between the blade tip and a first of said skirts and wherein said second elongate side has a contoured surface between the blade tip and a second of said skirts.
53. The scraper blade of claim 49 wherein the blade body groove has a shape adapted for engaging a substantially cylindrical blade holder.
54. The scraper blade of claim 49 wherein said elongate body includes a body portion and a tip portion, wherein said body portion is of a material of given durometer selected for providing desired flexibility to said pair of skirts, and wherein said tip portion defines said blade tip and is formed of a material of durometer substantially less than the given durometer.
55. The scraper blade of claim 54 wherein said material of said tip portion is of durometer of about 85.
56. The scraper blade of claim 49 wherein the blade body groove has an elongate slot in the groove for receiving an elongate bar when a blade holder having an elongate bar is disposed in the groove.

57. The scraper blade of claim 49 formed of a material compatible with the sanitary processing of food and food products.
58. A torsional tensioner for tensioning a member comprising:
- a mounting plate having a hole therethrough adapted for rotatably receiving the member;
 - an arcuate housing affixed to and extending from said mounting plate and being arcuate about an axis intersecting said mounting plate proximate the hole therein;
 - an outer collar spaced away from said mounting plate and having an arcuate edge complementary to the arcuate housing, said outer collar being rotatable with respect to said arcuate housing about an axis substantially intersecting the hole;
 - a clamp for fixing the outer collar rotatably with respect to said arcuate housing within a continuous range of angular positions;
 - an inner collar rotatably disposed between said outer collar and said mounting plate, said inner collar having a through hole adapted for receiving the member and being rotatable about an axis substantially intersecting the hole; and
 - a torsion spring coupled between said inner and outer collars for urging relative rotational movement of said inner and outer collars toward a relaxed position of said torsion spring.
59. The tensioner of claim 58 wherein said arcuate housing has a circumferential slot therein and wherein said clamp engages said outer collar through the circumferential slot.
60. The tensioner of claim 59 wherein positioning said clamp at an end of the circumferential slot corresponds to said torsion spring having a predetermined spring tension.

61. The tensioner of claim 59 wherein said arcuate housing has a further slot extending from the circumferential slot to an end of the arcuate housing.
62. The tensioner of claim 61 wherein a first end of said torsion spring is permanently fastened to said inner collar and a second end of said torsion spring is permanently fastened to outer collar, whereby said torsion spring and said inner and outer collars are removable as a unitary member by moving said clamp through the further slot.
63. The tensioner of claim 61 wherein the further slot extends to an end of the arcuate housing distal said mounting plate.
63. The tensioner of claim 59 wherein said outer collar has a threaded hole therein and wherein said clamp comprises a handle and a threaded stud extending therefrom through the circumferential slot to engage the threaded hole in said outer collar.
65. The tensioner of claim 58 wherein one of said outer collar and said clamp has a threaded hole therein and the other of said outer collar and said clamp includes a threaded stud extending therefrom, wherein said threaded stud engages the threaded hole.
66. The tensioner of claim 58 wherein said clamp includes at least one of a clutch and an anti-vibration device.
67. The tensioner of claim 58 wherein said inner and outer collars each includes a hole in which is disposed a respective end of said torsion spring.
68. The tensioner of claim 58 wherein one end of said torsion spring is permanently fastened to one of said inner and outer collars.

69. The tensioner of claim 58 wherein a first end of said torsion spring is permanently fastened to said inner collar and a second end of said torsion spring is permanently fastened to outer collar, whereby said torsion spring and said inner and outer collars are removable as a unitary member.
70. The tensioner of claim 58 wherein said mounting plate has at least one of a circular hole, a slot, a "T"-shaped slot and a combination thereof.

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